

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
14 April 2005 (14.04.2005)

PCT

(10) International Publication Number
WO 2005/033596 A1

(51) International Patent Classification⁷: **F25B 047/02**, 030/02, 029/00, 013/00

(52) Mitchell [NZ/NZ]; SH25 Te Kouma, RD 1, Coromandel, 2851 (NZ).

(21) International Application Number: **PCT/NZ2004/000234**

(74) Agent: **BALDWINS**; PO Box 5999, Wellesley Street, Auckland, 1001 (NZ).

(22) International Filing Date: 28 September 2004 (28.09.2004)

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data: 528678 6 October 2003 (06.10.2003) NZ

(71) Applicant (for all designated States except US): ENERGY SAVING CONCEPTS LIMITED [NZ/NZ]; 8 Lipton Place, Napier, 4001 (NZ).

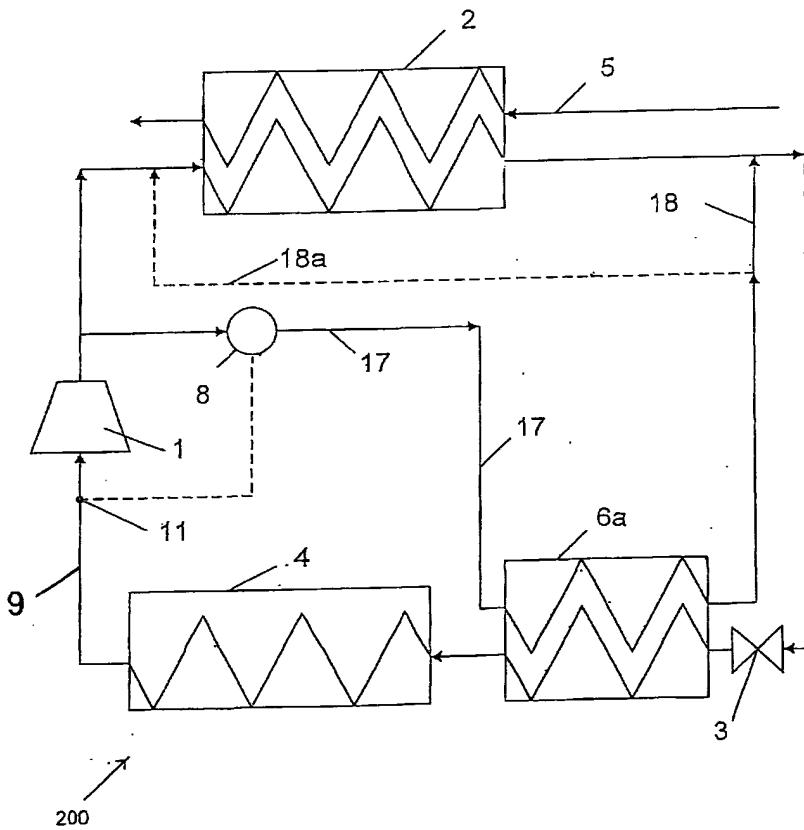
(72) Inventor; and

(75) Inventor/Applicant (for US only): INNES, Rodney,

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,

[Continued on next page]

(54) Title: HEATING AND DEFROSTING METHODS AND APPARATUS



(57) Abstract: A heat pump includes a compressor 1, a condenser 2, an expansion valve 3, an evaporator 4 and a heat exchanger 6a. The heat exchanger 6a is located immediately downstream of the expansion valve 3 and upstream of the evaporator 4. A controller 8 monitors one or more variables which predict when icing of the evaporator 4 may be about to occur by means of a sensor 11. When this is predicted the heat exchanger 6a will receive hot refrigerant through line 17 from the high pressure side of the compressor 1 so as to heat the refrigerant entering the evaporator 4 until ice formation is no longer likely. In an alternative embodiment, the heat exchanger may utilise an electric element to heat the refrigerant before it enters the evaporator. The heat exchanger 6a can preferably utilise a helically corrugated tube in order to enhance its heat exchange characteristics.



ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Published:

— *with international search report*